

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longi- tude	Lat- tude	Spot	Group	
1932	H m	°	°	°			
Jan. 26 (Mount Wilson).....	12 0	-72.0	175.8	+13.0	211	7	-----
		-31.0	216.8	+0.5	154		-----
		-8.0	239.8	-13.0			-----
		+24.0	271.8	+8.0	27		-----
		+41.0	288.8	-6.0	22		421
Jan. 27 (Naval Observatory).....	10 17	-64.0	171.6	+12.5	247		-----
		+5.0	240.6	-13.0	62		309
Jan. 28 (Naval Observatory).....	11 42	-50.0	171.7	+12.5	108		-----
		+18.0	239.7	-13.0	77		185
Jan. 29 (Perkins Observatory).....	-- --	-36.0	171.5	14.5	96		-----
		+30.5	238.0	-10.0	80		176
Jan. 30 (Naval Observatory).....	12 46	-22.0	172.7	+13.0	123		-----
		+46.0	240.7	-13.0	62		185
Jan. 31 (Naval Observatory).....	11 36	-9.5	172.7	+12.5	108		-----
		+59.0	241.2	-13.0	77		185
Mean daily area for January.....							98

PROVISIONAL SUN-SPOT RELATIVE NUMBERS,
JANUARY, 1932

(Dependent alone on observations at Zurich and its station at Arosa)

[Data furnished through the courtesy of Prof. W. Brunner, University of Zurich, Switzerland]

January, 1932	Relative numbers	January, 1932	Relative numbers	January, 1932	Relative numbers
1-----	12	11	0?	21	d 8
2-----	25	12	0	22	18
3-----		13	0	23	17
4-----	8	14	Mc	24	16
5-----	8	15	10	25	25
6-----	0?	16	15	26	d 42
7-----	0?	17	12	27	a 36
8-----		18	8	28	18
9-----	0	19	7	29	18
10-----	7	20	0	30	18
				31	17

Mean, 28 days=12.3.

a=Passage of an average-sized group through the central meridian.

b=Passage of a large group or spot through the central meridian.

c=New formation of a center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central circle zone.

d=Entrance of a large or average sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

[The Aerological Division, W. R. GREGG, in charge]

By L. T. SAMUELS

The free-air temperatures for the month were decidedly above normal at most stations and levels. (See Table 1.) At Dallas, Ellendale, and Omaha, negative departures in the lower levels changed to positive at higher elevations. At the more eastern stations the positive departures were exceptionally large while at San Diego they were negative at all levels.

Relative humidities were mostly above normal in the lower levels and below normal in the upper levels.

The resultant winds at 1,000-meter elevation were southerly as compared to a westerly normal in the northern

Gulf region. Elsewhere, the monthly values did not differ appreciably from the normals for this level. At 2,500 meters the westerly component predominated in the monthly resultants. A marked exception occurred at this level at Key West, where the monthly resultant was easterly while the normal is westerly. However, at 3,000 meters at this station the monthly resultant was south-southwesterly as compared to a normal west-southwesterly.

TABLE 1.—Free-air temperatures and relative humidities during January, 1932

TEMPERATURE (°C.)

Altitude (meters) m. s. l.	Chicago, Ill. ¹ (190 meters)		Cleveland, Ohio ¹ (245 meters)		Dallas, Tex. ¹ (149 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Hampton Roads, Va. ¹ (2 meters)		Omaha, Nebr. ¹ (299 meters)		Pensacola, Fla. ¹ (2 meters)		San Diego, Calif. ¹ (9 meters)		Washington, D. C. ¹ (2 meters)	
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal
Surface.....	-1.0	+3.3	2.8	+7.1	5.5	-0.7	9.4	+3.5	-13.3	-2.2	10.6	+3.3	-8.1	-2.1	14.8	+3.8	11.8	-1.3	5.8	+5.6
500.....	-1.7	+3.7	2.5	+7.9	6.3	+0.5	9.7	+3.8	-12.8	-1.8	9.5	+2.8	-7.3	-1.2	14.1	+3.5	9.7	-1.9	6.5	+6.3
1,000.....	-2.4	+3.0	1.1	+6.5	7.2	+1.5	8.5	+3.5	-8.6	+0.2	7.7	+3.0	-4.7	-0.1	12.5	+3.2	7.8	-2.1	5.6	+6.4
1,500.....	-2.2	+3.7	0.1	+6.0	6.3	+1.3	6.7	+3.2	-7.6	+0.5			-3.0	+1.1						
2,000.....	-3.0	+3.9	-1.7	+5.2	4.8	+1.4	5.3	+3.6	-9.5	+0.1			-3.7	+1.7						
2,500.....	-4.9	+3.8	-3.8	+4.9	3.0	+1.7	5.1	+5.3	-11.3	+0.5	4.8	+3.8	-5.8	+1.8	9.2	+2.6	3.5	-1.9	3.2	+6.6
3,000.....	-7.0	+4.0	-5.9	+5.1	0.6	+1.7	2.5	+4.9	-14.3	+0.1	0.7	+3.7	-8.0	+2.1	5.6	+3.0	0.5	-0.5	0.1	+6.6
4,000.....	-12.2	+3.6	-10.6	+5.2	-5.4	+1.2			-19.9	-0.1			-14.0	+1.4						
5,000.....			-17.2	+5.4	-12.1	+0.6							-20.9	+0.6						

RELATIVE HUMIDITY (PER CENT)

Surface.....	84	+5	80	+1	83	+6	85	+14	87	+6	76	+1	86	+4	86	+4	62	-1	74	+4
500.....	82	+7	80	+5	75	+5	76	+13	84	+5	76	+6	83	+4	80	+5	59	-1	61	-1
1,000.....	76	+11	79	+14	64	+3	69	+12	70	+4	71	+6	73	+7	74	+7	52	0	56	-2
1,500.....	61	+3	70	+12	55	+1	64	+11	62	+3			61	+2						
2,000.....	53	0	67	+14	49	0	56	+7	59	+1	51	+1	53	-4	62	+9	40	0	49	-3
2,500.....	52	-1	64	+11	44	-2	40	-5	57	-1			52	-4						
3,000.....	50	-4	60	+6	42	0	47	+4	58	0	37	-2	51	-5	54	+10	30	+1	34	-9
4,000.....	42	-13	54	-1	38	0			61	+7			43	-10						
5,000.....			51	-8	41	+5							38	-16						

¹ Normals for Royal Center, Ind., used.² Normals determined by interpolating between those for Groesbeck, Tex., and Broken Arrow, Okla.³ Naval air stations.⁴ Normals for Drexel, Nebr., used.

TABLE 2.—Free-air resultant winds (meters per second) based on pilot balloon observations made near 7 a. m. (E. S. T.) during January, 1932

[Wind from N=360°, E=90°, etc.]

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,528 meters)		Brownsville, Tex. (12 meters)		Burlington, Vt. (132 meters)		Cheyenne, Wyo. (1,873 meters)		Chicago, Ill. (198 meters)		Cleveland, Ohio (245 meters)		Dallas, Tex. (154 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Havre, Mont. (762 meters)		Jacksonville, Fla. (14 meters)		Key West, Fla. (11 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	26	0.8	153	0.5	215	2.1	293	5.2	255	2.9	221	4.7	62	0.1	240	0.9	292	2.5	245	3.1	333	0.5	87	3.4
500			152	4.5	217	5.6			237	7.3	232	8.3	200	1.2	244	3.0	292	2.5			163	3.3	104	8.0
1,000			172	4.8	240	6.2			245	10.3	252	9.6	291	3.4	252	5.4	316	6.2	257	6.5	198	5.6	114	6.6
1,500			203	5.2	254	7.4			258	10.6	252	11.8	282	5.8	265	7.3	302	7.1	274	9.7	223	6.4	123	4.9
2,000	296	0.7	218	6.4	283	10.3	290	7.0	256	15.1	278	9.4	281	9.7	287	7.8	280	9.8	280	9.8	263	6.9	125	3.9
2,500	261	4.9	160	1.2			298	9.7			248	13.3	264	12.2	272	10.8	286	9.8	281	9.6	285	6.0	127	1.8
3,000	272	8.7					299	9.7					265	12.4			284	8.8	289	9.6			205	2.1
4,000	261	4.9					291	11.2					252	17.8										
5,000	280	13.3					265	11.0																

Altitude (meters) m. s. l.	Los Angeles, Calif. (217 meters)		Medford, Oreg. (410 meters)		Memphis, Tenn. (89 meters)		New Orleans, La. (25 meters)		Oakland, Calif. (8 meters)		Oklahoma City, Okla. (392 meters)		Omaha, Nebr. (299 meters)		Phoenix, Ariz. (356 meters)		Salt Lake City, Utah (1,294 meters)		Sault Ste. Marie, Mich. (198 meters)		Seattle, Wash. (14 meters)		Washington, D. C. (10 meters)	
	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity	Direction	Velocity
Surface	357	1.3	206	0.5	167	1.5	41	2.0	76	0.2	201	0.7	331	1.7	125	1.3	156	24	305	1.0	156	1.0	318	1.8
500	58	1.1	262	0.6	218	4.5	103	2.8	348	3.4	220	2.6	306	3.1	102	1.7			307	2.6	182	3.8	283	6.8
1,000	27	2.9	164	1.5	249	6.5	203	3.7	347	7.0	255	6.8	286	5.8	107	0.4			286	1.0	194	5.0	293	10.2
1,500	27	4.7	194	1.2	259	7.5	266	3.8	339	7.4	258	7.7	289	8.1	258	1.5	186	2.7	271	3.6	221	3.8	287	12.2
2,000	2	6.1	243	2.6	262	8.5	254	7.6	336	7.6	260	9.5	275	9.3	256	3.2	219	1.8					284	16.3
2,500	334	6.6	257	3.6	261	9.1	257	8.9	340	8.1	256	10.4	273	11.2	265	4.6	265	2.6					283	14.7
3,000	330	7.5	250	2.6	247	11.5	258	10.0	337	7.5	259	13.7			271	7.7	291	5.2						
4,000	348	11.6	295	3.0					328	9.7					291	12.5								

WEATHER IN THE UNITED STATES

(Climatological Division, OLIVER L. FASSIG in charge)

THE WEATHER ELEMENTS

By M. C. BENNETT

The marked features of the weather for January, 1932, were the abnormally high temperature in the East and decidedly low temperature in the West.

The average temperature for the month ranged from 4° to 12° above normal east of the Great Plains, with the greatest departure above normal from the Ohio Valley northward, eastward, and southeastward, some stations in the Middle Atlantic States showing the warmest January in 100 years. On the other hand, the western portion of the country was decidedly cold, with the greatest deficiencies ranging from 5° to 10°.

The precipitation was generally heavy in sections having the warmest weather and was excessive in much of the south Mississippi Valley; large areas received from two to more than six times the January normal, while in marked contrast some nearby sections, as eastern Florida, southern Texas and the northern Plains received only 50 per cent or less of the usual amount. West of the Rocky Mountains precipitation was generally light, many sections receiving less than normal.

TEMPERATURE

The general situation in January was much the same as that prevailing since the middle of November, 1931; remarkable mildness continued in the eastern half, while low temperatures were the rule in the far West. The greatest temperature excess during January was found farther to northeastward than before, and the middle Plains region, instead of averaging warmer than normal, was now colder than normal.

The mildness in the eastern half was comparatively steady, while in the West the southern Plateau region was almost constantly colder than normal. The opening week was especially warm compared with normal in the north-central portion and particularly cold in Utah and districts adjacent. During the latter part of the first decade, while warmth continued in the East, temperatures above normal prevailed in the Pacific States and the far Northwest, particularly in Montana. The first half of the second decade had about the warmest weather ever known in January in the upper and middle Mississippi Valley and thence eastward to the Atlantic coast. However, the middle and latter portions of this decade were cold in most of the central and northern Plains and almost throughout the West.

The final decade of January began with warmer weather in Montana and the Plains, and with marked warmth continuing in the Lake region, the upper Ohio Valley, and to eastward, but with notable cold in most of the Plateau region. About the 28th a decided cold wave reached Montana and North Dakota whence it spread westward, southward, and eastward, so that the month closed with low temperatures prevailing in all but the southernmost States. The arrival of this cold wave ended in several districts prolonged periods remarkable for absence of low temperatures. For example, Harrisburg, Pa., had every day warmer than normal from December 10 to January 30, inclusive, January 13 being 32° warmer, and Keokuk, Iowa, reached 1° below zero on January 30, the first below-zero reading at that place since January 29, 1930, two years and one day earlier.

The month averaged warmer than normal in the eastern half of the country and in most of Oklahoma and Texas,